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OUTLOOK NOTES

WHENEVER the cause of good secondary education wins a battle its friends may well rejoice that the conflict came. But during the stress of the fighting there must needs be anxiety and, sometimes, discouragement. During the greater part of the past school year the struggle was on in Detroit. In November 1897, a member of the board of education introduced a resolution which aimed at cutting the high-school course down from four years to three, giving a diploma for the course "the same as is in vogue in other cities of the Union." Sciences and all foreign languages were to be taxed out of existence, that is, pupils were to be compelled to pay a tuition fee for these studies, while instruction in Reading, 'Riting and 'Rithmetic was, presumably, to remain free. Principal Bliss very naturally came to the defense of the splendid high school that he had so largely built up, with the result that the enemy concentrated their fire upon him. In the latter part of May 1898, just before the final settlement of all pending questions for the year, there appeared a public address to the citizens of Detroit, entitled: "Detroit High Schools; Shall Their Standing be Maintained?" This was published in full in the Detroit *Free Press*, and issued in pamphlet form for general distribution. The address was prepared by the citizens' committee, endorsed by all the literary, educational

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OF DETROIT

and women's clubs of the city. The address presented a masterly array of facts to disprove the assertions of the enemy and to establish the position of the high school and of its principal in the educational world. The document had the personal signatures of between two and three hundred individuals, among whom a stranger to the city has no difficulty in recognizing the most prominent of Detroit's citizens. Detroit was stirred as it has not been for years on any educational question. But the support given the high school and its principal by the best elements of the city was magnificent. So furious was the opposition to the proposed "reforms"—reforms of the nature of those recently undertaken in Minneapolis, to which attention was called in the October SCHOOL REVIEW, only worse—that the "reformers" were driven to cover. The cause of righteousness again won a glorious victory. Principal Bliss is still in Detroit, and the curriculum has not been reduced to three years. There is a moral to all this that is worth heeding. The cause of good secondary schools can be permanently injured only by the apathy of its friends. When there is developed a good healthy fighting spirit, the good, the progressive, and the right is never long in danger, is never swept to lasting defeat.

SEVERAL notes and articles on the subject of international correspondence have already appeared in these pages, all of which, **RECIPROCITY** however, applied to the system as organized in **APPLIED TO** France. An early number of the SCHOOL REVIEW **EDUCATION** will contain an account of the same movement in Germany, where it is now thoroughly organized. The question may well be asked whether an organization for directing this work is not now in order in the United States. Until such a body appears on the scene, the editor of this journal will do what he can to serve those who may become interested in the movement. The number of letters already received shows the possibility of arousing a wide interest in the work. The purpose of this movement, to restate it briefly, is to place pupils in our schools and colleges—and teachers and other adults for that matter—in

personal correspondence with persons similarly situated in either France or Germany, the correspondence to be carried on in the languages of both correspondents. Thus is the principle of reciprocity extended to the realm of the schoolroom. The movement has more than a pedagogical interest, too; such international correspondence between young people will make wider horizons, promoting in no indirect way good feeling among the nations of the earth.

C. H. THURBER

THE TRUE SPIRIT OF CLASSICAL CULTURE¹

Χρυστον δὲ καὶ ἀργύριον εἰπεῖν αὐτοῖς δτι θεῖον παρὰ θεῶν δει λέπι ψυχὴ ψχονσιν
—PLATO: Republic 416.

I.

HOWEVER highly or lightly we may chance to esteem classical culture, this much at least must be conceded, that it has been an important force in educational history thus far. In passing judgment upon its nature and value, we should therefore adhere rigorously to the rule we apply to intellectual forces generally, namely, that they are to be judged not by their abuses and perversions, nor by what they have failed to achieve because of imperfect comprehension or imperfect performance on the part of those who represent them, but first of all according to their genuine inner tendencies. Otherwise we shall be forced to condemn in some degree almost every intellectual and moral force that has appeared in human history because of some defect in its application. For nothing exhibits itself practically in its full theoretical measure, and there is a sense in which this hackneyed and universal truth finds expression even in such a theatrically worded dictum as that of Rousseau:² "Everything comes good from the hands of the Creator; everything degenerates in the hands of man." We must, then, take intellectual forces as we find them in operation, and discover whether their imperfections are inherent or extraneous, before we can pass any just judgment upon them.

All this is so obvious and dangerously near to commonplace, that its repetition would be unnecessary, were it not for the fact that so elementary a rule of sound thinking has not been sufficiently adhered to in discussions about the classics. Arguments are freely made to the effect that classical culture is

¹ Address before the Classical Conference at Ann Arbor, April 1, 1898. See p. 479.

² *Emile*, opening sentence.

antiquated and ineffectual, that at its best it is merely one of several forms of literary culture, perhaps theoretically better than any of the others, but not practically so, either because of inferior teaching or because it is intrinsically less valuable for our modern life. The attack on the practical results comes to this: Even if classical culture is what its advocates believe, nevertheless they do not succeed in exhibiting attractively its true spirit, and this justifies the suspicion that classical culture, after all, may not be so excellent as they suppose. The end of such reasoning, so far as based on inferiority of teaching, is inevitable. It drives us to the conclusion that inferior teaching proves a study inferior, if not worthless. Herbert Spencer falls into this line of thought in his well-known contrast between the study of languages and science. He asserts that since "in the acquisition of languages *as ordinarily carried on*, these natural relations between words and their meanings are not habitually traced nor the laws regulating them explained, it must be admitted they are commonly learned as fortuitous relations. On the other hand, the relations presented by science are causal relations, and, *when properly taught*, are understood as such."¹ Let us turn this around. Instead of contrasting "the acquisition of languages as ordinarily carried on" with science "when properly taught," we may contrast with the same propriety, or impropriety, "the acquisition of science as ordinarily carried on" with "language when properly taught." Rather let us do neither, but inquire into the real nature and value of the several studies, and rate them accordingly. If, after this is settled, we find something in the nature of one or another study that is sure or likely to prevent teaching it with advantage, all very well. The defect is then radical and incurable. However, if the defect is not in the nature of the study, but in our means and methods, then the trouble is extraneous and may be removed by increasing our means and improving our methods. But let every defect, whether inherent or extraneous, be estimated according to its kind and degree, for only after this has been done can we

¹SPENCER: *Education*.

rationally determine whether and to what extent any study may be embodied in a working scheme of education.

II.

In answer to the criticisms, both practical and theoretical, the historical argument has been pressed into service. The great and undeniable fact that classical antiquity, particularly as revealed in the ancient writers, bears a fundamental relation to our modern life and thought, has been shown again and again. But the argument, though valid, is imperfect, if taken bare and by itself. It establishes the existence, but not necessarily the value of the relation. Of course we think well of our modern culture, and, if convinced that the classics are vitally related to it, would insist on studying them. In the same way a modern Chinaman might argue complacently for the Chinese classics, and a Turk for the older Arabic literature, as important to their modern culture.

But such arguing on our part, be it good or bad, does not touch the criticism based on the too frequent inadequacy of our teaching. No matter how radical our obligation to the ancient world, still, if as a matter of fact a fair appreciation of this cannot be brought surely into the possession of our students by their classical training, we had better content ourselves with other languages and literatures, provided they are well taught. And to such a view who can reasonably object? But is it true that our teaching is so bad? Bad enough, if judged by absolute standards, by the ideal excellence of classical culture or even by the best achievements of classical teaching. But is it so bad, when compared with the existing teaching in other subjects? Here we must ask the privilege of saying that it is not. Let us ask especially whether it is worse than the present teaching of French and German, for these constitute the most commonly proposed substitute for the classics. Does our existing instruction in French and German ensure a sound and fine appreciation of these literatures? Let us grant that it does. But is it a better appreciation (for this is the real question) than our classical

training secures in its own sphere? Those who are most familiar with schools and colleges the country over will not say so. And if this is a practical question, let us be consistently practical. If we displace the classics, the imperative and highly practical question remains: What linguistic and literary material have we now available or obtainable that can be proved to be not merely as good, but clearly better. For something better is what is needed, if progress is the object. It will not do to say that English will serve. Suppose it is really better. Are we to study only English on the side of language? The question is what foreign languages, now better taught or likely to be better taught, are available? The answer is easy. There are none.

Again, the historical argument, taken bare and without analysis, does not meet the theoretical objections. There are three of them, all phases of one thought. It is asserted that initial historical forces, no matter how powerful at the start, like the classics in relation to modern life and literature, enter into succeeding ages in an ever weakening ratio of influence. Then there is an argument derived from this, namely, that our modern culture is gradually but certainly tending toward independence of classical and mediaeval antecedents, and the additional argument that the more enlightened modern nations are themselves becoming originating centers for the culture of the future. The picture is charming because it suggests endless progress, but has the sad fault that it is all foreground and no background. Of course the one question asked about such a picture is how far it is real and how far imaginary. Can it be said with any soberness that these three theses are incontestably proved? Are all initial historical impulses of one sort? Are not some of them clearly local and transient, and are there not others that bear the aspect of universality and permanence? Is this true of moral ideas? Is it true of intellectual factors generally? Greek geometry entered early, and in whatever part or sense it reached its measure of development its art has never been matched since. The ideas of Roman law have modified modern law, and operate in it incessantly. Universities are the creation of a past age.

The best and latest historian of their origin writes: "Their organization and their traditions, their studies and their exercises affected the progress and intellectual development of Europe more powerfully, or (perhaps it should be said) more exclusively, than any schools in all likelihood will ever do again."¹ If initial forces must decrease, what rational explanation can be offered for such an outburst as the Renaissance? Is not the true explanation to be found in the theory that some initial forces are primal, original, self-renewing, and therefore enduring.

The other phases of the theoretical criticism spring from the one just noticed. If it is not true, they are not proved or provable, at least in the sense in which they are intended. Modern culture is said to be moving away from us toward its own independence and to be forming into an originating center for the culture of the future. Is it? So far as the relation of classical to modern literature and thought is causal, such an independence is illusory. We can no more safely ignore our historical antecedents than our physical environment. We may, of course, draw up a scheme of modern culture, discarding the classics. Such a scheme may give a good education, a much better education for many than one which includes the classics. But that is not the question. The question is, what is intrinsically the best education? And no education is the best which does not aim at universality, which does not acquaint the student with all the great categories, very few in number, which we must master, if we are to understand ourselves and our world in origin and progress. If our civilization is trying to break from causal antecedents of value, it is trying to develop abnormally, but it is not destroying the existence of these antecedents. It is cutting loose from what it needs to know, and to know as well as possible. This may be labeled progress, but it is progress from knowledge toward ignorance.

III.

I have said the historical argument, taken bare and unanalyzed, is valid but imperfect, because while it avails to prove

¹RASHDALL, *Universities of Europe in the Middle Ages*, Vol. I, p. 5.

the fact that classical culture bears a radical relation to modern culture, it does not necessarily prove the value of the relation. And this is the vital question in the whole discussion. If the relation is not substantially valuable, we are wasting time in teaching Greek and Latin. We can meet criticism on our ways of teaching, by showing we are not worse off than others and by improving our methods. We can meet the criticism that we are opposing the natural evolution of modern learning by showing that evolution does not mean the destruction of primal rational impulses, but that the progressive unfolding of these is what gives continuous value to human history. But such arguing, though it suggests, does not prove that what we have is worth having. The classics may be an old and persistent force. Yet, for all we have shown, they may be one of the less valuable or even hindering forces, a drag on our progress, and hence a force to be antagonized and resisted. I know it seems absurd to us, who love and believe in the classics, that we should be asked to prove their value. That value has proved itself, like a tried friendship, in the intimacies of our best life. Is our confidence a delusion? We cannot be brought to think so. Is our confidence rational? So we believe, but do we really know?

Let us seek an answer by the one method which enables us to assess the value of any intellectual force. Let us subject classical culture to direct analysis and so discern its constituents. Let us find by inspection the elements which constitute the true spirit of classical culture. This is what we propose to examine, and not some caricature, perversion, or substitute. Nor is it Latin and Greek in their entirety. We are not proposing to teach this. Life is not long enough, and the whole of Greek and Latin is not worth teaching, however abundantly it will repay the advanced student to explore much that is useless even in a scheme of university instruction. We are asking for the best only. *Classicus aliquis scriptor non proletarius*, "not the rabble of writers, but the really classic," is the happy canon of Aulus Gellius, to whom we owe our earliest record of this use of the term "classic." It may well be ours.

If we could summon before our vision all the traits exhibited in the various writers, as in a vast gallery of portraits—some of them almost perfect in spite of time and some of them only partially preserved—and discarding all their differences should seek to blend in one likeness their best resemblances, how difficult and yet how simple would be the task! Difficult, because we have to put in words a charm that is felt as soon as seen. It is the charm of immediate assent to suggestions of perfection, a charm that hardly bears definition and vanishes if examined mechanically. It is the charm we feel in the presence of a master-work of ancient sculpture, or in the subtle art of a proof in Greek geometry. Though subtle it is simple, when once we penetrate to its meaning. Its constituents are so few, each springing from the other and each so intimately in the other, that the charm remains unbroken, not alone in its effect on us, but in its own ideal unity. It must then be with an apology we try to phrase such things. If the sensitiveness of the Greek ear for musical tones was such that they noticed and enjoyed lesser shades of modulation than we recognize, how are we to speak of the best spirit of that fine and complex ancient literature otherwise than in the rough?—rather by way of indicating where the excellence lies, than by displaying it in its own pure clearness.

To begin, then. The first trait we may notice is orderly thinking. It appears in the logical character of the languages themselves. Every word, every structural part of a word, stands for a distinct thought. "Every sentence in Greek is a problem in English" was a favorite maxim of Hadley. But he was a Greek professor. Then what of this: "The structure of every sentence is a lesson in logic" is the same thing from the lips of John Stuart Mill, who knew both Greek and logic as few have known them, and was withal a thoroughly modern man. It is not merely a grammar we study in mastering Greek and Latin sentences, but grammar in general, the logic of universal language. May I quote Mill again? After reviewing this subject and summing up the value of grammar in general, he concludes by saying: "In these qualities the classical languages have an incom-

parable superiority over every modern language, and over all languages, dead or living, which have a literature worth being generally studied."¹ Such was the instrument of expression which the Greek, and in a lesser degree the Roman, used from childhood. Their sentences were not made as exercises in logic, but their expression was orderly because it was the natural utterance of orderly thought. Even where they fell into error, they rarely fell into confusion. We go into raptures over the creations of a long series of artists, as in the case of Gothic architecture, or the outworking of some profound scientific doctrine, built up as great masters are followed in their work by greater pupils, or admire the historical making of English poetry, wherein successive dramas and lyrics, idylls and epics combine, in Shelley's lofty words, "as episodes to that great Poem which all poets, like the coöperating thoughts of one mind, have built up since the beginning of the world." Alike admirable, though different, is the development of these languages, only in part recorded,—languages built up by unseen forces through many ages, undirected by consciously coöperating intention, and yet coming to orderly perfection of expression as surely as if shaped from the beginning by one mind.

Pass from language to literature. Orderly thinking is again supreme. The Greek writer takes his theme in hand. To his native habit of orderly thought, there is now superadded the conscious intention of adult reason, and, it may be, the impulsion of genius. Perhaps it is a Plato or an Aristotle. Here we are in the region of the literature of philosophy. So let us again ask a modern philosopher to say better than we can how strict their thinking was. "To question all things; never to turn away from any difficulty; to accept no doctrine, either from ourselves or from other people, without a rigid scrutiny by negative criticism, letting no fallacy or incoherence or confusion of thought slip by unperceived; above all, to insist upon having the meaning of a word clearly understood before using it, and the meaning of a proposition before assent-

¹ Inaugural address at St. Andrews.

ing to it; these are the lessons we learn from the ancient dialecticians."¹ How endlessly might such testimony be cited from witnesses who have deeply studied the classics, and are at the same time modern men. And such preëminently can give the testimony of experts.

We must hurry on to the second trait of the best classical culture. I mean refinement. It is the natural sequel to orderly thinking. It is something very different from what is often understood by the term. It is more than delicacy of taste, which, unsupported, so easily degenerates into fastidiousness, or even effeminacy. Sydney Smith must have had in mind this spurious form of refinement, so common among dilettanti nearly a century ago, when he caustically spoke of "the elegant imbecilities of classical culture." We are speaking of something else. It is the refinement of thought. We may be orderly thinkers and yet do no more than think in outline. This is sound and necessary, but it is not all. A man who can do no more than this does not get beyond routine. As Volkmann acutely observes: "We may be the best of logicians without on that account progressing a single step in our knowledge."² After the main lines are clear, and we have followed out the side lines and branchings, we must still divide and subdivide, define and distinguish, until the last limit of division is reached. Otherwise we shall never know anything by exact estimation and in its inner completeness. We shall be forever thinking in the rough. If we may borrow terms from chemistry, orderly thinking is our qualitative, and refined thinking our quantitative analysis. Here comes in the subtlety of nice discrimination, of separation into least parts—all of them related and yet all seen separately in clearest definition—of exact exclusions and inclusions, with nothing dragged in and nothing left out, with no overlappings or interferences, nothing superfluous and nothing missing. Associated with this keen study of the little differences, of the "trifles which make per-

¹ MILL: Inaugural address at St. Andrews.

² Erkenntnisstheoretische Grundzüge der Naturwissenschaften, p. 18, Leipzig, 1896. Volkmann is the successor of the eminent Franz Neumann as professor of mathematical physics at Königsberg.

fection," there is a growing appreciation of the relevancy and real value of the various ideas we are estimating. "The difficulty of rational judgment," says Volkmann,¹ "does not lie in the difficulty of correctly judging. It lies rather in the manner and method of obtaining the truly appropriate material." This fact becomes clearer to our understanding, when we realize how refinement of thought underlies refinement of taste. When the exact truth of a geometrical proposition has been traced up to the conclusion, suddenly the whole becomes lucid, "having no part dark." Then it is the pure delight of the scholar is realized. The proof is beautiful to him, because seen to be finely and completely true. He has had a lesson in refinement of taste as produced by refinement of thought. The refined taste in its turn keeps reacting happily on refinement of thought, and gradually comes to serve as an instinctive test of the crudeness or finish, the excellence or banality of our own or other men's thoughts. By sifting out the crude and base, and receiving ideas only after testing them and refining them of their grossness, "it obtains and arranges the truly appropriate material" of thought. For lack of such refinement, many men, sharp enough logically, never get beyond logic. This blended refinement of thought and taste, moreover, adds the touch of grace and distinction to the ideas on which it works. From this point of view how sane and subtle are the words of the elder Disraeli: "To adorn ideas with elegance is an act of the mind superior to that of receiving them; but to receive them with a happy discrimination is the effect of a practiced taste."²

Can there be a great literature, or science, or art, or philosophy, unless it embodies many refinements and much refinement of thought? And if refinement of taste be added, is it not still greater? For then only does it approach perfection of form, and "in perfection of form" as Mill assures us, "the preëminence of the ancients is not disputed."

¹ *Erkenntnisstheoretische Grundzüge*, p. 20.

² *Literary Character of Men of Genius*.

The third and greatest trait of the best classical culture is ideality. It is alike the inspiration of the other two and their completion. Historically speaking, they are derived from it. Analytically speaking, it is the end toward which they move. And what is this ideality, this supreme thing which animates and rules ancient literature? It is nothing less than openness of mind to ideas in their worth, relevancy and beauty, and such a trait reposes and must forever repose on no other basis than the love of truth. Is it truly in the classical literature? Who are to answer this question, except those who know best? And who can know best about any subject who has not studied and studied deeply? We appeal, then, not to those who have not, but to those who have made experimental acquaintance with the best classical literature to say whether ideality is not its very life and soul. Who has ever heard of an instance where a man of real classical culture, gained at first hand from the original sources, has given a negative answer? And why not hear the answer of the ancients themselves? "It is a sacred duty to prefer truth," is Aristotle's reply to the query whether truth is better than friendship, "for though both are friends, truth is the better friend."¹ Let us hear a lesser writer, and a writer too of the decadence. "For my part I am persuaded," says Polybius, pausing in his long History,² "that there is not in nature a greater goddess, or any that has stronger power over men than Truth. For, though all unite in opposition to her, and though falsehood draws up a whole train of probabilities and sets them in array against her, she triumphs, I know not how, and forces her way into the heart. Sometimes her power is instantly discerned. Sometimes she is obscured for a while; but appears at last in perfect splendor, and surmounts by her own force alone the falsehood under which she has been oppressed."

Such are the elements out of which the true spirit of classical culture is created. Order, refinement, ideality, these three, and the greatest is the last. Look at our modern culture. Are these things valuable? Are they not invaluable to all who

¹Ethics I, 6, 1.

²History XIII, 5.

believe in the worth of thought and reason? Are they not valuable to all thinking, even the commonest, and indispensable to the highest? This is the great lesson of the classics, a lesson for all time in the finest of fine arts, the art of thinking, and its companion the art of expression. Do we not need this lesson today? Is it not the lesson which will charm the finer minds, and allure them to orderly, refined, ideal thinking, whether it be in science or philosophy, literature or history? The enemy of the true classical spirit is not science, as some have supposed. It is the utilitarian spirit, which is as hostile to science as to the classics. No matter what names and labels are used in discussion, let us not be deceived. The sharp conflict of the future is not coming between the pure classical and the pure scientific culture, for each of these needs the other, but between liberal culture as a whole and the forces of technical education. Not that we are in any way opposing technical education, except when it poses as a form of liberal education, which it is not, and cannot become, without ceasing to be what it now is.

A word in closing this paper. There is still one objector we must answer. It is the one who persists in saying "This is all very fine and very true, and I will acquire your wonderful culture by studying the classics in translations." He will do nothing of the sort, let him try all his life. But suppose he could. The obstinate question remains: Is this the best way to do it? Of course not. It is no more the best way to deal with Greek and Latin, than with French or German. And is not "the best way the way to take? Is this settled and steadily resolved upon? If so, then why not do away with makeshifts and substitutes, except as makeshifts and substitutes. Is it a good way to study the classics? Yes—a fine way to study translations of the classics, and a good way to study the classics at secondhand. But is this what we are proposing to study? There is something a translation will never yield and that something is what the author said as he said it. The most certain way of conveying in language the unspoiled original thought of anyone is by speaking. *Verba labris nascentia*, "words born on

the lips," though first conceived in the mind, these alone pass directly from speaker to hearer in their purity, and with all the living interpretation of voice, look and gesture. Next in closeness to the original utterance, comes repeating or reading aloud the words of another, and next after this comes silent reading. The voice of the classical author is silent. We strive to understand him, by doing the next best thing to hearing him speak. We read his words. If we are to get so far in our appreciation that we may justly imagine we are very near to hearing him, and even catch the echo of his voice, then it is his very words, the original utterance that is indispensable, and we become all the more assured as to our understanding of what the author meant, by understanding what he actually said. Last and least comes reading by translation, because it is furthest removed from the original utterance.

One other comment. Always in some degree, sometimes in a high degree, adequate translation is impossible. And the very thing that is impossible to translate is what is peculiar to the original and often constitutes its charm. This the reader of translations must always lose.

We need have no fear of the future of classical culture, except as we have cause to fear for the future of orderly, refined and ideal thought, or from our own imperfections as teachers. With the first we are deeply concerned, but no more and no less than are the men of science and philosophy. With the second we have immediate practical concern. For according to the measure in which we possess the true spirit of classical culture and inspire it in others, will our difficulties disappear and the indestructible ideas we strive to represent extend their influence, help to sustain our higher culture, and in things intellectual

"be still the leaven,
That spreading in this dull and clodded earth,
Gives it a touch ethereal — a new birth."

ANDREW F. WEST

PRINCETON UNIVERSITY

SCIENCES IN THE HIGH SCHOOL¹

I HOPE that my coming before you without a written address will not be considered by the Schoolmasters' Club as an act of courtesy. Following the advice of the physician who suggested to a friend that he try his prescription upon the dog, I have tried this method upon the dog for some seventeen years, if I may so irreverently designate the body of students who have come under my instruction; and having thus tested it, I venture to hope that the mode of administration may be agreeable and the medicine itself not injurious.

I am to speak to you in somewhat more general terms than is indicated by the subject which I rather hastily sent to the secretary, "Observational Sciences in the High School," for I have more to say upon the general subject of science in high schools than I anticipated. Afterwards I shall consider specifically those sciences which I designate as observational.

I hope you have little expectation of anything novel upon this much discussed theme; if you have none, your expectations coincide with mine, for I feel that it will be practically impossible for me to say anything which in substance is really new. Yet, perhaps, we may find that when the kaleidoscope is turned by a strange hand, discrete thoughts will fall into some new combinations, and I may trust to your own bright wits for the reflection of these thoughts into symmetrical and coherent forms.

The query, "Shall science be taught in the high school or not," belongs to the realm of settled questions. It is scarcely debated; it is certainly no longer debatable. The immense strides which science has made in the past few decades, the tremendous impulse which it has given to all forms of human

¹ An address to the Michigan Schoolmasters' Club, at the 29th meeting, Nov. 26, 1897. Stenographically reported, and revised by the author.

enterprise and industry, the new comforts which have been introduced into our lives through its help, have so directed popular attention to scientific development and have made scientific study so attractive, that the people who support the schools have demanded and are surely obtaining the teaching of sciences in them.

But the question which is still debatable, and must, I think, be carefully considered is, "What is the rightful place of science teaching in the high school?" At the very outset let me call your attention to the fact that in discussing this question extremely faulty comparisons are often made. When the time needed for adequate science teaching is under consideration, it has not infrequently happened that the teacher of Latin has complained that too much time was being allotted to the sciences; indeed, teachers of the classics are inclined to be rather jealous of the growing amount of time, as well as of the growing attention, devoted to these topics in the high-school curriculum. Have we not all observed that our friend the Latinist is apt to compare the amount of time assigned the sciences with the amount devoted to Latin?—forgetting that the rightful comparison is not between Latin and the sciences, but between Latin and some one science; or, if you please, between the sciences and languages as a whole. Let us make sure first, that we are comparing comparable branches of learning; then only shall we be able to decide justly the relative time to be accorded to science teaching. Lest I be misunderstood, I must allege that I am not decrying Latin and Greek; I have derived too much help from the training gained through their study to seek to diminish in any way the honor that rightfully belongs to them, and the important place to which they are entitled in our courses of instruction. I do not misprize their disciplinary value; I only exalt the discipline of science, which I think I may fairly say is equal to theirs in degree, although different in kind. If our friends who are interested in the language studies are saying that time, long and continuous, is indispensable to obtaining this discipline from Latin or Greek, I am saying that

time, long and continuous, not in the sciences, but in *some one science* is equally indispensable to the acquisition of the discipline which these sciences undoubtedly yield to one so pursuing them.

In order to determine the rightful place which science teaching should have, one must first examine the very numerous claimants for place in the high-school course. Notice what has been done in the admission of science to high schools; what great diversity there has been in the different schools; what a great number of sciences have been taught at one time or another in the schools. You will hardly fail to be surprised if you examine the courses. I enumerate only the important ones which have commonly found a place: physics, chemistry, botany, zoölogy, physical geography, human physiology, psychology, astronomy, and geology. No such a list of sciences as that can be taught, certainly they cannot be properly taught, in any single school. Yet I was employed in a city high school which had *seven* of these in its curriculum, and I was not permitted to reduce them below *five!* Indeed, we find almost as great a variation in the number of sciences admitted to the high school in one place or another, as in the choice of subjects.

What has determined this great variation in the choice, number, and character of science subjects? I imagine the course of many schools has been developed in very much the same way that Topsy developed, it "des growed." Without any serious consideration, this topic has been introduced, and then that, until by and by an unsymmetrical body, with irregularly disposed branches, without any particular relation to each other, has resulted. When we find a misshapen organic form in the plant kingdom, we are sure that nothing will help it so much as judicious pruning. That is equally true of the curricula of many schools. A man with judgment, empowered to lop off those things which are easily and rightfully dispensed with, is greatly needed in most high schools.

But even if the choice of the subjects has been carefully made, the selection is liable to be based upon what is called pedagogical adaptation; that is upon the idea that such and

such topics are suitable for pupils at the age or stage of development ordinarily met at the time at which this subject is to be taught. I fear I shall speak heresy if I say that this notion of "pedagogical adaptation" ought not to constitute a chief factor in the choice. But the orthodoxy of today was the heresy of yesterday. Pedagogical adaptation is often an expression not for an actual *thing*, not for that which exists. When one says that such and such a science is "adapted" to fourth-year pupils, it merely means that his idea of the part of a science to be presented and the manner of presenting it is adapted to seniors in the high school rather than to freshmen. But there is a freshman aspect of every subject and a senior aspect. They are not the same; and he is a poor excuse for a teacher who would present the same material in the same way to pupils of such different powers. Instead, therefore, of making some one's conception of a science the basis for including it or excluding it from the high-school course, of teaching it in this year or that, choice of it should be determined by an entirely different criterion; *then* demand that the subject so entered in the course be presented to the pupils in a pedagogically correct fashion. In other words, I should adapt the teaching of a subject to the pupil, and not try too strenuously to adapt the subject to the pupil. That may sound a little like the difference between "tweedledum" and "tweedledee," but I think it is really important.

The considerations which actually determine the choice of subjects are not simple and unrelated; they are composite, and interlocked in such a fashion that it is extremely difficult to separate them and consider their individual value; and even if the best choice is made, it is possible that it will be rendered entirely futile by incompetency on the part of the teacher. And therein we meet what is universally conceded to be the crucial point in the whole matter. It is useless to insist to you who are devoting your time and attention to teaching that the teacher's relation to the success of the school is an absolutely vital one. We all believe it after a fashion; yet I wonder if we believe

it so as to act upon it? How many of us at one time or other have been—we are tempted to say forced, yet if we tell ourselves the truth we cannot quite say that—put into a false position by having assigned to us a study which we knew perfectly well that we were not competent to present to the pupils? How many of us—and I am talking to myself now as much as to you—have gotten money under false pretenses in that way? It is difficult, especially when one's bread and butter may depend upon it, to say to a principal or superintendent, "I cannot teach that subject as it ought to be taught;" and yet common honesty, I believe, requires us to decline to attempt teaching for which we know we have not adequate preparation. How difficult it is for us to secure real success! How many causes of failure are there on the part of the teacher! To all these inadequate preparation is fundamental and of it I must speak again later.

But given adequate preparation, lack of adaptability is the chief source of failure. The teacher who tries to introduce into the high school a miniature of the course which he has been through in the college, what a misfit he is! Better would it be had he never seen the college than to force upon the high school this imitation. The teacher who cannot adapt himself to the needs of his pupils, who cannot put himself into their places and see their difficulties, is sure to be a failure. Adequate preparation may, indeed, be nullified by inadequate adaptability.

When we desire to reach a definite object in any line of action, we are accustomed to consider first, what is the goal to which we desire to attain; we ask, what is the end sought, and then rationally endeavor to adapt our means to that end. Before, therefore, any choice is made in regard to what subjects shall be taught in the high school, we must ask ourselves just what we intend to accomplish by science teaching in the high school.

As I see it there are mainly two things to be secured by such teaching; two things, I mean, in the way of discipline, for I leave out of consideration for the present the question of the informational value of any subject. I acknowledge that every

science has important information to impart to its students. I grant the full value, practically and theoretically, of such information. But I look upon science teaching as the Latinist upon his teaching of Latin, not as of value for the information in regard to the Romans and their enemies, which the student may derive from it, nor for the historical facts which he may get incidentally from his reading of Livy or Tacitus, but as *of value for the mental discipline which it imparts*.

The first of the two objects which is to be secured is the cultivation of the power of accurate observation, and the training in the method of deducing general principles from particular facts. That, it seems to me, is the primary end to be attained; and it is fundamental because our method of education, far too greatly, I take it, has been directed to dwarfing the power of observation. True, we are beginning to remedy that by the introduction of observational sciences in the lower grades; but we have been systematically developing the memory at the expense of the power of observation.

The second thing which is to be done by science teaching is to develop the capacity for determining exact data and deriving therefrom accurate results. To express these two objects in other terms, I may say that we need to train the powers of the student by methods which may be called on the one hand *qualitative* and on the other *quantitative*. Or, to put it in another way, one object is the cultivation of the *ocular accuracy*, the other is the cultivation of *instrumental accuracy*; while from the reasoning involved in both methods the outcome is *logical accuracy*.

Now these two disciplines may be secured from any single science, and whether one or both is secured depends upon the way in which that science is presented. For example, it is perfectly possible to set a student to the examination of the living plant, and ask him to determine with accuracy the structure of every part of that plant. Agassiz is said to have set his students at work upon a fish, and when they had reported the next day the points which they had seen he set them at work

upon the same fish; and so on and on for days until they had finally seen all that there was to be seen about the object which he had given them. For the beginner this is monstrous misuse of time, but it is a famous illustration of the way in which students were finally trained to discover things which they were unable to see at first. In some such way, with the guidance which he needs, the student may have his eyes sharpened until he is capable of correctly observing the peculiarities of plants. But if in the physiological laboratory we set him at work with balances, with electrical apparatus, with gas apparatus, to determine the exact changes which go on in that plant in the course of its life history; if we set him to find out how much carbon dioxide it breathes out in the course of twenty-four hours, and how much oxygen it consumes in that time, we can develop an ability to determine exact data and to derive from those data exact results. From the two methods we secure two quite different disciplines; the one is qualitative, the other quantitative. It is the same in physics. We may set the student at work in qualitative physics, and we get one kind of training; if we set him to determine the physical quantities, we get another.

But certain sciences are better adapted than others to secure one or other of these results, especially if we take into consideration the way in which these sciences can be presented in the high school. Training in qualitative work, *i. e.*, along observational lines, can be given better by the use of the biological sciences than any others. Training in quantitative work, *i. e.*, along instrumental lines, can be given better and more readily by the use of the molecular sciences. By these considerations, therefore, we have our choice narrowed on the one hand to botany and zoölogy, and on the other to physics and chemistry. Understand, this is purely from the view-point of discipline.

Having so far limited the choice of sciences for the high school, what other factors are to be considered? Our choice is further restricted by the too frequent changes of teachers and the differences in their preparation to teach particular subjects.

In order to overcome this difficulty, in part at least, I advocate great flexibility in the curriculum of the high school. Suppose this year we have in the school a teacher who is well trained in botany. Unfortunately, next year we lose that teacher, and are obliged to secure one who is not well trained in botany but has had thorough preparation in zoölogy. The curriculum calls for botany; the teacher is trained to teach zoölogy. What shall we do? By all means let him teach zoölogy, and do not force him to do poorly what he is really not prepared to do at all. Let the curriculum be flexible enough so that we may have botany one year and zoölogy the next, if necessary to secure good teaching; and I should say the same thing in regard to physics and chemistry. I am quite aware that I shall be answered, in thought if not in words, that, in the first place, the university at the head of the school system of the state requires botany for entrance, and the high school has no option; and, in the second place, that the thing is not practicable. To the first objection I answer that no university will insist on poor botany when it can get good zoölogy as an equivalent; and to the second, that it is thoroughly practicable, and has been done in actual school administration.

Our choice between the biological sciences is further limited by the character of material required. It is easier to obtain, to preserve, and to use the material upon which botany depends than that upon which zoölogy depends; therefore, other things being equal, I should say botany is better adapted to the high school. In the same way our choice between physics and chemistry is properly influenced by the cost of equipment and maintenance. In many cases this is financially of dominant importance. I should say, other things being equal, that physics is the better of the two for high-school purposes; primarily, because it is better adapted to quantitative presentation than chemistry, and also because its equipment and maintenance is less expensive.

Since there must be a choice of subjects, for the reasons given I say that *botany and physics should be made the backbone of*

the science course in the high school. But what of other sciences, human physiology, astronomy, etc.? These stand, I believe, upon a wholly different basis. They may be considered as desirable only for their informational value, and this is certainly very small in most cases. So I care very little about the informational sciences of the high school; what they are and how much shall be given of them must be determined by the available time of the student.

Ninety per cent. of the high-school students, it is often alleged, do not go to college; they do not get any information except that which comes from the high school. Shall we not give them, then, this information? Passing by the false percentage, upon the same ground we ought to give them a great deal more information. Do you not see that this argument proceeds upon the tacit assumption that education is wholly or chiefly a function of the schools?—an assumption as common as it is false. But, of course, pupils cannot get from the schools all the facts that might be useful to them if applied. What? Shall we not teach human physiology (by which name we designate a sort of hodgepodge of human anatomy and hygiene with barely enough real physiology to salt it) in order that the high-school pupils may know how to live? They *must* know how to care for their bodies! But they certainly derive very little advantage from this study miscalled physiology. It is not the hygiene of the high school, but the hygiene of the home and of the doctor that mainly influences our children. And even did they have to rely wholly upon the school, I should rather have a man who had been thoroughly trained in one or two sciences set to consider how he should live, than a man without such training who had been taught all the hygiene that is contained in the elementary text-books. I say this because such a man would be able to carry out an experiment and discriminate its factors with some exactness. Think you that we should have the immense sale of patent medicines if people knew how to experiment? What does the average man do when he experiments with a patent medicine? He performs an experiment in

which he knows and considers only one of the factors, while there may be forty others of which he has taken not the slightest account. So he attributes his recovery to the power of the medicine, the one factor that he does know. Do you suppose a man who had been properly trained in a physical laboratory would reason in that fashion? He ought to be too wise to call such foolishness an experiment.

A theme which has been the subject of endless discussion is the order in which the subjects chosen are to be presented. Each teacher is inclined to think that all other subjects are merely the foundation upon which his is to rest as the superstructure, and therefore he wants all other studies to precede his in the curriculum. The teacher of physics is sure he cannot get along without algebra and trigonometry. The teacher of botany would feel exceedingly happy if he could only have physics and chemistry to precede his work, and the teacher of geology thinks there is no geology for the pupil unless he has studied physics and chemistry and biology. Much of the discussion has based itself upon what is called the logical relation of subjects. But it seems to me that the logical relation of subjects is unimportant for the arrangement of studies in the high school, because every subject can be presented to the pupil in that aspect in which it is suitable to his powers, and must be so adapted if it is properly taught. If botany is put in the first year, the suitable aspect of botany can be presented to the first-year pupil; if it comes in the fourth year, it can be presented to the senior; but he would be a foolish teacher who in either content or method taught both in the same way. Is it not true, therefore, that we may let this whole matter of precedence of subjects adjust itself to the necessities of the school or the teachers, and not feel any particular subject defrauded of proper place because it does not come after some other? This is not saying that there is not a logical relation of subjects considered in their fullness; but we do not present subjects in their fullness in the high school.

Keeping in mind the conclusion that physics and botany

should constitute the backbone of the science work in the high school, I ask next, What should be the relation between laboratory work and the text? Naturally this must depend, in part at least, upon the time devoted to each. If you ask me how much time I would have, I say, *at least* a year in physics, and *at least* a year in botany; if possible, a year and a half of each, with daily work, for which the laboratory periods shall be double the usual recitation period, and therefore not less than ninety minutes. Less than a full year for each science deprives it largely of disciplinary value. If any think I ask too much, I may remind them of the demand that Latin shall be given for four years. What would be said if the botanist were as greedy?

At present we teachers of botany are busily engaged in insisting that there shall be laboratory work, and a great deal of it, because we feel that that is the first necessity of right presentation of the subject; but with this insistence, I believe we do not forget that there should be a coördination of the facts gained in the laboratory with the general principles illustrated by those facts; that we should use the facts of the laboratory to illustrate a text which deals with the wider fields. I do not believe the lecture adapted to pupils in the high school, and should not use it with elementary classes in the college when it is possible to obtain a text-book. Unfortunately that is not always easy to do; yet even a poor text-book is better than none, for the teacher who knows its faults may more readily correct them than undertake to cover the ground in lectures. But let us not forget for a moment that no teacher of botany advocates the use of the text-book except as a supplement. A book used in any other way is misused. Let it be understood that I strenuously insist upon the necessity of laboratory work in sciences.

The failure to coördinate laboratory work and general principles nullifies discipline. I have questioned pupils in schools, who were painstaking users of the compound microscope day after day, to find out if they knew what they were seeing with the compound microscope. They had no conception of the

plants they were studying ; but they had accumulated a mere mass of facts, more or less isolated and unimportant, which they might remember a few weeks and then forget forever. Do you not see what this is? It is merely a repetition of memory training. It is the old wolf of memory masquerading in the sheep's clothing of observation. Correlate the laboratory work ; make it illustrate general principles ; enable the pupil by its means to overlook the wider fields.

There is another danger from over-insistence upon laboratory work, and that is the danger of forming a habit of superficial study. I have seen schools in which students were rushed from one plant to another, skimming the surface features without getting hold of significant structures, until they had become so confirmed in the habit of casual study that the discipline of laboratory work was largely lost. This danger is especially great in any qualitative work ; and teachers are led into it from a desire, sometimes almost unrecognized, to have pupils cover as much ground as possible. Let us rather strive to intensify the laboratory work ; it is not necessary to present all the science in a twelve-month. Far better that work should be so arranged so as to hit hard and often the principal facts.

I have already spoken of another danger, that which arises from the imitation of college courses in the high school by teachers without adaptability or with a strong habit of mimicry. Such courses are positively harmful and leave pupils puzzled and discouraged. They need prompt aid if they are to escape mental asphyxiation.

Let us now turn from these general principles to a more specific discussion of the teaching of botany.

I ask first, What has the high school done with botany in the past ? It has done very much what the colleges and universities have done in the past ; unfortunately it tends to continue the old ways a little longer. I think I may fairly characterize the teaching which I condemn as the presentation of a botany butt end first. We have gone at it like the militia dealing with the unruly mob, who are ordered to "reverse arms

and give 'em the butt;" the pupils are stunned by it but not penetrated, and hundreds have received such a distaste for the whole subject that as soon as they have "had botany" (with much the same disgust as they felt when they "had" the measles), they are glad to think there is to be never an opportunity for them to have it again. Curiously enough, this is the history of the teaching of every subject. I scarcely think of any exception. When we have endeavored to present what we falsely call the elements of a subject, we have given to the student the philosophical concepts which are reached after long study. Have not text-books reflected this method in setting before the student a mass of definitions? How many text-books on physics are there on whose first page there is not a definition of matter and force and molecules? When we present these subjects in that way we are simply making it impossible for the student to grasp them. How many classes have been rushed through definitions of a leaf and of its forms, the flower and the variation in its form, the stamens, pistils, and all that sort of thing, in order that they might get ready to study plants? Again and again have teachers said to me, "We go over these definitions rapidly in the first six weeks of the spring term so as to get ready for the spring flowers." Happily that day is passing away, and we begin to see that the study of classification is a study for the university graduate. But people object to it—even teachers. Someone says the child ought to know the names of plants and flowers and the trees with which he meets. When a friend comes into the house, do you say to the child, "Now, Harry, here is a new specimen, and I want you to observe very closely the form of his body, the color of his eyes and hair, the ornaments he wears, and make a complete set of anthropological measurements, and write them down on this piece of paper; when you have done that I will give you a genealogical table by which you may ascertain his name." Absurd? Yes; but is it more absurd than the way we treat him about our plant friends? What you do with your friend is to give the child an introduc

tion to him. You say, "Harry, I want you to know Mr. Smith." Why should we not treat him in the same way in regard to plants? Probably Harry will not know Mr. Smith the next time he sees him, and he may not know the white oak the next time he sees it. "Harry, you remember you met Mr. Smith the other day? This is he." "Harry, you remember you saw the white oak the other day? Look at it and see if you know it." When we teach the child about birds we do not set him to measure the bill of the robin, or the distance between the eyes, or the length of the primaries; but set him to see how the robin behaves, how he lives and moves and has his being. Now, can we not answer those who object to the dropping of the work miscalled "analysis"?—the parents who say to the teacher, "You do not know how to teach botany if you cannot teach my son as I was taught it; I want him to study it as I did." Such objections are actually made, and have been related to me again and again by teachers. Rather than follow the old paths which led a few into pleasant fields while they repelled the many, let us devote attention to what a plant *is* and what it can *do*.

How can we best teach the pupil what the plant is and what it can do? By letting him observe what plants are; not merely one kind of plant, but representatives of the four or five great groups, the algae, fungi, mosses, ferns, and seed plants. I see no objection to devoting the greater part of the time to the seed plants, because we must recognize that this is the largest group and the most important and demands the consideration of the young student more than the others; but I would not have him ignorant of the other groups. We can teach him what a plant can do by qualitative experiments, and especially those which involve a study of the relation of plants to the living world, the animals and plants about it, and to the inorganic world, the soil and water and air by which it is surrounded. Every course in botany should include physiology, to be introduced just as soon as students have acquired an adequate knowledge of the structure of plants and the plans upon which they are built.

In planning any course there are innumerable details which

it is absolutely indispensable for each teacher to work out for himself. Only a few general statements can be made, and these largely by way of emphasis of what was said in the course of the afternoon discussion, for I am traversing ground with which you are familiar.

1. First of all, because it is fundamental, I cannot refrain from referring again to that old matter of an adequate preparation. The teacher who has studied botany for twenty weeks cannot possibly teach botany for twelve weeks to high-school pupils as it ought to be taught; it is simply out of the question; not even a genius can do that. In fact there is necessary for the teacher of a subject who must address himself to primary students a much more extensive acquaintance with the subject relatively to the advancement of his pupils than is required of the university teacher. No one can make a subject simple who does not know it from bottom to top as compared with his pupils, and I believe that there is even greater need in the high school for well-trained teachers than there is in the university.

2. The laboratory periods *must* be at least twice as long as the recitation periods. I know all the objections that are brought up against that: we cannot get time; we cannot possibly give that double time; it interferes with the whole schedule. This is because the schedule was constructed without any reference to those double periods. It *is* possible, provided there is adequate help, and that can only be secured when it is observed to be indispensable.

3. It is absolutely necessary that the teacher who is conducting the laboratory shall have at least the period before the laboratory work to get ready for it. No teacher can leave a class in algebra or history and immediately take a class in botany and do it justice; he cannot teach it as it ought to be taught without time for preparation of materials and directions. Instead of thinking such time clear gain to the teacher, the superintendent ought to be aware that it is clear gain to the pupil and the busiest time in the teacher's day.

4. It goes without saying nowadays that there needs to be a

laboratory room, properly equipped. This demand is not visionary even for the smallest school. I know the small high school and its limitations in the way of time, teachers, apparatus, and room. I know all these can be overcome by persistence and energy.

And when you have overcome the present difficulties will the university cease to create more? Will it ever be satisfied? Never; never! You need not expect the time ever to come when the university will cease saying to the high school, come up higher. It may not continue to call for *more* work; it should never cease to demand *better* work. Why, indeed, should it? The university and the high school are parts of one system. With the state university standing at the head, the public-school system is as much an organic whole as the human body. When the head ceases to say to the hands, "do thus and so," there is no evidence of maturity, but of death. So there will always be these demands from the university, because the university occupies a vantage point from which it sees clearly opportunities for its own improvement and feels it necessary for the secondary schools to grow with it.

Apart, we can do nothing; we must work together in this common cause, for this glorious aim, which is ultimately our country's good.

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SPECIALIZATION IN PREPARATORY NATURAL SCIENCE

IN my address at Milwaukee in 1897, I led up to this idea in consideration of the best ideals and most available material at our command in the high and preparatory schools. (Proceedings N. E. A., 1897, pp. 917-923.)

On further study I am more than ever convinced that this idea has come to stay. We find it already working itself out, under our dim and sluggish eyes, and we have been almost reprehensibly tardy in recognizing it. Any work done, in a radical rearrangement of our preparatory natural science courses, will be largely wasted unless we take full account of this all-important factor.

For convenience we will consider some of the arguments in order :

I. The Analogous Preparatory Classical Course.

The real admission of natural science to the preparatory curriculum dates from 1883 when Charles Francis Adams, in his celebrated address at Cambridge, pleaded for a substitute for Greek as a fundamental element in practical college culture. How slow we have been to take advantage of the tide which has been carrying us onward faster than we have realized!

The older colleges—if I understand them—confess that the problem is mainly to find a substitute for Greek. Of course this looks like a timid confession of indifference to the great claims of natural science (and the modern languages), but at least it gives us something definite to talk about: *A substitute for Greek*. This is not indefinite. Preparatory Greek is not a jumble of nine or ten three-months' courses of anything—not a set of three or four one-year courses of different things; but a clear, hard, business proposition of *three or four years' work on one thing*.

Now, whether we shall be able to find a substitute for this

may be an uncertainty in some minds; but, if we find it, we certainly shall not find it in short, choppy, superficial courses in many subjects. The whole magnificent history of the old fashioned preparatory course advises us, with all the emphasis of its complete success as compared with the cheap "English" courses of the last two decades, to hold fast to specialization in a few subjects in all our planning. This seems so simple and clear that I hesitate to weaken the force of the argument by tarrying unduly on it. But I do challenge every one who was working at the Greek of the high and preparatory schools a score of years ago, to answer this question: Was there not a great gulf fixed between the text-books, the students, and the work of the classical and the English courses? Was not the one *hard work*? Was not the other relatively "*a picnic*?" Could we not turn from our Hadley, our Goodwin, our Xenophon, our Homer, and take up the average text-book of the English course in much the same way that we treat the summer novel? And why? Because Greek, for one thing, meant hard work, hard beyond comparison with any alternative taught in the English course. Then, in granting an option, let those of us who consider natural science only as it may offer a substitute for Greek, pause to examine carefully the vouchers of the new claimants. I have spoken much and written some hard criticism against the conservatism of the New England colleges in their hesitancy to admit *good* natural science in the list of entrance requirements. But perhaps they are wise in refusing to listen to the enthusiast till he shall offer a real substitute for Greek; and if offered in natural science, it can mean but one thing, that is *three or four years' work in one science* or in such a set of sciences and so related that they may unquestionably count as one.

In emphasis of this point, let me quote a paragraph or two from my Milwaukee address⁴:

I shall describe what I believe to be one of the best preparatory science courses ever carried on; it is the course I understand best, the course essentially to which I have given ten years of support, and with a fairly successful experience; and, further, it is approximately parallel with the standards of

many of the best high and preparatory schools in the country. It may be outlined as follows :

First year—physical geography.

Second year—physics.

Third year—chemistry.

Fourth year—biology.

Now, to illustrate the comparative weakness of this, allow me to suggest a scene for you to construct in imagination : Let us suppose that the historical course of education had been reversed, and that natural science, well taught for centuries, were holding dominant sway in all the schools of learning to the exclusion of all philology. Suppose that suddenly a new wave of language study should advance in rivalry with the old scientific culture. In such hypothetical circumstances, what would the conservative natural science people think of the dignity and thoroughness of a natural-language course of four years, with, say, one year in English, one year in Latin, one year in French, and one year in German ? Now, such a language course could claim all the arguments advanced for our course of four sciences of one year each. But would our supposed science censors listen for a moment to such a feeble, incoherent, undignified proposition ? They would refer it back indefinitely, until the language people should present a course representing some simplicity, strength, and thoroughness.

II. The Necessity of Recognizing Electives between Specialized Classics and Specialized Natural Science.

The arguments for the recognition of the principle in theory are too familiar to need comment here. Such recent articles as those of Mr. C. C. Wilson (*THE SCHOOL REVIEW*), of Professor R. S. Tarr (*The Journal of Pedagogy*), and the discussion in the May number of the *Educational Review*, illustrate the irresistible tendency of the times in asking for a worthy alternative to specialization in Greek. Now this is very good—in theory ; but what do we find in fact ? Simply this, that at present, as a rule, there are no highly specialized courses in the secondary school curriculum which, in discipline and thoroughness, compare with the classical course.

I am told everywhere and all the time, by broad, liberal teachers in high schools, men who recognize the full value of natural science, both for discipline and culture (are they not identical ?), that they are compelled to advise the best students

to take the classical course because it is the only one offering opportunity for genuinely hard and continuously hard work on the same subject.

So, then, we have no real alternative to Greek yet offered in natural science. We shall not have it until we provide similarly specialized work.

I know that this may be very trite to many readers, but it is well to emphasize the point. Our conservative reader will say that it is not possible for the secondary schools to offer such an alternative, at least at present; and meanwhile why trouble ourselves about experimenting with that which will surely take much time and give much trouble?

The answer is, and many of us feel certain about it, that the preparatory ultra-classical course is not suited to develop all minds to their best advantage. I recall several students who, beginning with me in secondary work and following on to college, have specialized from the very first in chemistry. As students and men, they are as strong, broad, and growing as any parallel products produced by the classical course.

And as a matter of fairness, those of us who are interested in natural science, must claim the right to offer the bait of specialized work that we may catch our share of the good fish. Indeed, good minds among the students of natural science are as indispensable to the right development of these courses as they are for the preservation of the classical courses. Is not this right? I believe the time has come when all good teachers want only those students who should naturally come to them.

This then is our second argument; we need, and at once, highly specialized courses in natural science to meet the wants of a large half of our best students in the secondary schools.

III. The Necessity of Offering Electives Between Highly Specialized Branches of Natural Science.

This argument, tending towards certain specialization, is based on the amount of work asked by each specialist, and the place he prefers in the course, as he becomes more interested in the preparatory science curriculum.

Now, each of the fundamental sciences cannot monopolize all the time, nor have the pick of the time, except in one way, and that is, by allowing the student to elect between alternative specialized courses.

Those who have worked on such courses, know what pranks physics has played with our supposedly good, one-year sciences. And at present we see that physics, in compounding with mathematics, has outstripped the rest of the sciences.

Well, what is to be done? Are the enthusiasts in mathematics and physics wrong in their unconsciously selfish effort to rearrange our preparatory science till they gobble up most of the time? Not at all. They are right; they are simple working out the inevitable tendency towards specialization, and we need not fear it one bit. Simply let us ask that all students be not required to specialize in mathematics and experimental physics; but that the non-mathematical ones be allowed an option on similarly special courses in chemical or biological or physiographic science.

And here I may venture the suggestion that our committee will satisfy neither themselves nor the times unless they work their way out to alternative specialized courses nicely adjusted and coördinated in election.

IV. The Inherent Power in Natural Science for Discipline.

We come now to the *positive advantage* of specialized work in natural science—the one great argument. Most teachers recognize both the *disciplinary* element and the *information* element in natural science; each contributes to the other; both help the student in making himself a student. But, if either is the more fundamental, can we hesitate a moment in pronouncing for the disciplinary element? Would not any other judgment amount to a failure to realize what natural science is?

The main steps in the inductive method—and this inductive method is only systematic *common sense* applied in observing, registering, comparing, all of it in a word is only orderly common sense in studying, for our purpose, the material world—have we not covered here the main steps in the inductive method?

Now, this is the point, viz., can this systematic common sense in natural science study be carried to the degree where the method may attain real value of discipline in thinking, unless we carry it on continuously and in logical sequence so that it involves specialization? If we take any other position, do we not at once confess that we doubt the disciplinary value of natural science as one of its chief features? But we all are really agreed about this; then why not apply it, and at once? Why not hold consistently to the main point, viz., that most of us of a material bent, learn to think by bringing our minds into close and accurate touch with material things? I do not say there is not another side of culture, of vital importance to all, but we are now discussing the material side.

Now, if this has been logically developed, if careful, orderly, long-continued work on a few things involves discipline (and the best discipline, as I believe), why not hold to the position and apply it?

Now, mental discipline grows cumulatively, by training the memory, the best memory, which remembers because the mind learns easily what it understands; and continuous work in one line cumulatively helps the mind in conceiving what is continuously studied. This of course is known by all of us. Why do we not apply it?

Hence the first, great, positive argument for specialization is found in the disciplinary element.

V. The Inherent Power in Specialization to Provide the Requisite Collateral Information—Supplementary Reading.

Now there are several lines of natural science, and the well informed student must have at least a general acquaintance with all. How can the student get the merely informational element in all of these lines if he is specializing only in one?

This may be done in two ways—firstly, by short half-year introductory courses in the subjects other than the one specially worked at, and secondly, by supplementary reading, and this point deserves a large paragraph.

If there is any one quality common to all mental culture, it

is probably this—the power to fix and hold the attention on the subject in hand, whether it be a text of Xenophon, a problem in geometry, an experiment with the transformer, a separation of two metals, or the dissection of a lobster.

Now this ability of the specializing student, whether he be a classical, literary, or scientific student, this ability to hold his attention to one subject for close observation and accurate thinking, this is the one quality which in my experience marks the great difference between the specially trained student, and the student who has dipped into many things without thoroughness in any. The difference has been referred to in the earlier part of this article, but it needs emphasis and continued reiteration. It is the main thing we are talking about—the development of students; and it holds good for students of secondary grade, because our stock illustration is drawn from the old preparatory course.

Some of my classical friends, from this confession of the inherent strength of the old preparatory classical course, may reason that it is the best preparatory course for all; but I am not afraid of that; the old preparatory classical course has its strength, and, for the student of natural science, its weakness; but that has been already referred to under argument II.

Of course we assume that the preparatory natural science curriculum refers to only about one-fourth of the work, and the rest involves Latin, German or French, English, history, literature, and mathematics. But, to hold to the main point, discipline of mind carries the inherent power of concentration of attention on *any subject*. And here we find another great, positive argument for specialization (both in natural science and also in other lines). This self-control of concentrated attention can be easily, economically, and effectively employed in bringing up the collateral and supplementary reading. This must be considered, for it is the main argument to be put forward against the often alleged narrowness of specialized courses.

I conceive it quite possible that the average special student of natural science in secondary schools may, by judicious advice

and wise economy of time, cover, in supplementary reading, as much ground and as well, as that covered by the average student in the average non-classical or non-specialized "English" course, *in toto*. I believe the average specializing student can do all this and keep his special work well in hand at the same time—and all by reason of his power to do intensive work.

I might give illustrations in which I have seen this done. I will mention that I have seen the elements of physics, chemistry, mineralogy, geology, astronomy, natural history, history, English literature, etc., covered in the high school, without direction and without encouragement, by one who was at the same time a specializing classical student, a fair swimmer, skater, and ball player; and all this general reading was taken up merely in the way of recreation.

Now this is possible. I doubt not that many of my readers, experienced teachers of specialties—could parallel or outdo my statement and yet keep far within the limits of historic truth in their personal history. But the point is, that, after giving the student the power to do *intensive* work, he will take the main responsibility in providing himself with information drawn from *extensive* reading; he must, he should, he will. It is perfectly safe to leave the responsibility there with the judicious advice and assistance of the wise, cultured teacher.

If then we concede that specialization does this, if it equips the student when under wise direction, to guard against narrowness by providing for the information element also, if these main points are covered, viz., (1) thorough knowledge of one subject, (2) power of concentrated attention, (3) power to acquire outside information, what more can be asked of a prospective system?

VI. Discipline in Natural Science as a Basis for the Later Study of the More Abstruse Sciences, such as History, Economics, etc.

The inductive method is the same wherever applied. We sometimes carelessly use the term "science" as though synonymous with "natural science;" we forget that the abstract sci-

ences are, or may be, just as truly sciences as the concrete. Now, does it not seem reasonable that many students will have a better equipment with which to grapple with the science of the partially abstract, if they first learn the common sense (inductive) method from the concrete, where observation may be easily made and tested?

As a matter of fact, I have had occasion to recommend many of my best special students in chemistry, to take courses in history and economics, and invariably they showed unusual power of grasping the relatively intangible by reason of their power to grasp the tangible. Many good students who lose their way in the abstract sciences, might retain a common sense control of their work, if they had been previously equipped with training in the concrete. This is a strong argument and one that will well repay attention and practical application in our curricula.

VII. The Ethical Argument.

But we may go farther—the ethical element? Yes, for students of natural science make a specialty of applied ethics. This is not humor; it is in most sober earnest.

In general, as President Thwing remarks in a recent article—"hard work is an enemy to easy morals;" and hard work in natural science will illustrate this sound doctrine. But in more detail, is not the knowing of some few things thoroughly the best basis for the honest and right prosecution of those subjects? In learning how hard it is to know the truth in a few things, does not our student have honest thinking stamped into his whole mental and moral make up? Then there is a moral force in specialization. Universal superficiality is immoral.

In this age of active, branching thought, there is one unifying agent, among the many articulating elements of culture, which needs emphasis. It is this: honest leaders in different lines respect each other; they are frequently intimate friends—not because of common information along the same lines, but by reason of the specializing power and its inevitable result. They reach down, unconsciously perhaps, into the deeper foundations where all is cemented by the spirit of thorough honest work.

This point finds too common illustration to require much comment. A specialist in Latin, history, or economics, "chums" with a specialist in physics, or chemistry, or biology—why? Because they are all good fellows—a very important point—and they understand each other through the pentecostal tongue of the honest specializing spirit.

This argument is worthy of great expansion, but it is enough for our present purpose to note it, and to acknowledge it. It applies itself with remorseless certainty.

VIII. Are Specialized Courses Suited to All Students?

After a hasty reading of this article, it might seem to follow that this specializing tendency should be recognized and its method required for all students. Personally I feel more and more inclined to follow the opinion of President Eliot, that "the best preparatory course is the best finishing course." I find, in this, a guiding idea in our present maze of opinion and rapidly changing opinion. But it may require careful application.

Most laboratory conceptions require some modification when applied on a larger scale, and in competition with economic factors. Many of our taxpayers think they want a "general" course; they have had it; they have it. But more serious than this (because the taxpayers are reasonable people, they will listen to sound argument, and they can be led around to reasonable views, especially if it can be shown that the specialization idea is, for the student, the best economic idea)—there is another fact—I fear it is a fact, though I wish it were not and hope it is, at worst, only a temporary fact. It is this: all scholars apparently have not the making of good students in them. Our course, as we have planned it, implies brain power in all students; the implication is not always justified. I must confess that in my experience, as a rule, the feminine sex is incapable of holding to the work implied in chemical specialization. At least the lesson is a clear one, that all scholars are not fitted for all specializations. Yet I have found that many, incapable (perhaps through lack of interest) of natural science specialization, are yet quite capable of good specialization in other lines,

as language, history, literature, all of equal value in our cosmopolitan system. Perhaps the problem is only the selection and adjustment of the appropriate specialty for the respective student.

The making of a good student often depends also on many factors not commonly considered—an undying love of knowledge, a cordial encouragement from home influences, home influences which should ideally represent culture—a high and grand ambition. All of these factors have their influence. But all these will be of little influence if the school work be superficial.

IX. The Economic Argument.

A colleague, who is a specialist in economic and legal history, maintains, and I think rightly, that most settlements of large political questions are finally adjusted on an economic basis.

This economic factor is a serious problem to face, as we urge the application of the specialization idea, but it should not frighten us. If it is the best thing for the individual student economically, the people—the taxpaying people—will see it, and they will demand it. And they will not excuse us, in our implied function as educational advisers, if we advise timidly or suggest diffidently or indefinitely.

If it should appear, on more experience, that specialized courses are, as I have argued, always best for the good students, and further, if it shall appear that all students have, as we hope, some elements of good in them as students, then the economic problem is only a question of honest, courageous explanation to the taxpaying people. They will gladly support the best. They will prefer in comparatively poor (financially) country high schools, where only one teacher of natural science can be had, that he shall be a specialist. They will prefer that the large city high schools should do all their instruction through specialists, well trained and well equipped, and they will pay for it; for such special work gives the student full information in one line, it gives him power of concentration in any line, it gives him power of acquiring all requisite general information; it makes him a student in school, it makes him a man in life—what more can we ask?

X. The De Facto Argument.

This is the practical point for us as advisers of the secondary courses—what can we do now?

If the mass of the specialists in our colleges were really alive to the requirements of the problem, and really believed, and in a sanguine way, that it were feasible, we would see many instances of highly specialized courses in natural science already in practical use in secondary schools. Our secondary schools are working out this problem, usually willing to listen most courteously to the college men, and frequently, "pity 'tis, 'tis true," receiving only cold indifference or worse still, arrogant, cruel, criticism of their best attempts.

Let those of us who are college instructors ask this question, and let us put it to ourselves. How long a time would be required to train a student to become master of any natural science? Would we be willing to put less than ten or twelve years as the limit? It is very common to find students who have put that amount of time on Latin or Greek. But (with no unpleasant comparison in mind), are the natural sciences smaller subjects than Greek or Latin? Is the literature smaller, the progress less rapid, the demand for mental and physical work less exacting?

I suspect that nearly all of what we commonly call college science is really only work of a secondary grade. And if it could be put down there and handled properly, as it surely will be—if we could receive our incoming students with a good start in specialization, then we could add to their college work, most of what is now called graduate work. And then, on this basis, graduate work would advance to what it ought to be—a *real mastery of the subject*, and a real piece of research of three or four years' work. Then we should see real leaders in science produced by our universities more commonly than we find them as yet. Hence, improvement in the secondary grades will enforce improvement all along the line, and our college specialists are beginning to realize it.

And here I would ask my colleagues, specialists in the many

colleges and universities, is it not time *now* for us to make our suggestions, now while the times are ripe? Is it not time to cease believing that it is an impossibility for the secondary schools to teach sound natural science in one or several lines for three or four years? It has been done for years in the classics. Are the natural sciences the cheap small things implied by our present secondary courses?

It has been intimated that this tendency to specialization is active in our midst, and we note that many schools already give more than a year to physics or chemistry; and in arranging related and dependent subjects, such as biology, botany, zoölogy, physiology, etc., care is taken to arrange them so that they may articulate and form as far as possible one subject. The tendency is clear; it only needs encouragement. I can see clearly that the elements of inorganic chemistry, analysis, organic chemistry, physical and electro-chemistry, the history of chemistry, etc., can be so shaped and ordered that they may form one continuous subject; and similarly each specialist in his line can plan an appropriate course, capable of practical application in secondary schools.

I know that a committee of natural science teachers in one state is even now planning a high-school course where alternatives between specialization in the various natural sciences (physics, chemistry, biology), are distinctly recognized.

If we can have the problem thus definitely stated, there is great hope that many sections and associations will shortly take up this restatement of the problem for study, discussion and immediate application.

Let us hope then that here we have found the clue which will auspiciously and certainly guide us to ultimate success. It has guided the genuine scholars of all time and they have followed it instinctively, loyally. It is the clue of specialization, *not many but much.*

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AN IDEAL COURSE IN HISTORY FOR SECONDARY SCHOOLS

IT is happily no longer necessary to adduce arguments to prove that history is the peer of any subject, both in informational and educational value. This is now generally conceded. And substantial agreement has also been reached regarding the best methods of instruction. But opinions still differ not a little as to what constitutes an ideal course of historical study.

It may be well, before entering upon a discussion of the unsettled problems connected with this question, to enumerate briefly the points which may now be regarded as settled. These are, it is believed, somewhat as follows:

1. That historical study should be continuous during the last four, and preferably six years, of the elementary school.
2. That in an ideal curriculum at least three exercises per week should be devoted to history throughout the secondary school.
3. That the history of Greece and Rome should be taught, because of their contributions to the modern world, and the striking simplicity and power of their leading personalities and forces.
4. That the history of England should be included because of its intimate connection with American history, and because the world is indebted to England for constitutional government and the modern system of industry.
5. That for many and obvious reasons a thorough study of American history and civics should be made in the last year of the course.

The chief matter still under discussion is the advisability of teaching general history. The Madison Conference cast its commanding influence for the substitution of French or German history, and this proposal has been approved by the New England

and New York conferences. Yet expressions of radical dissent are heard, both from the rank and file of high-school teachers, and from recognized leaders of educational opinion. Thus Professor Salmon in a recent article, entitled "Unity in College Entrance History," makes a strong plea for the retention of general history. Professor Hudson, representing the University of Michigan, has urged that general history be given in preference, if need be, to English history. And even President Adams, who was chairman of the Madison Conference, declares in the introduction to his *Manual of Historical Literature*, in most felicitous and emphatic words, that a general outline of the subject should be secured before proceeding to the detailed study of special nations or epochs.

The reason usually assigned for this proposed substitution is the difficulty of teaching general history successfully. It is apt to fall into the Scylla of mere routine memorizing, or, if this be avoided, into the Charybdis of vague and meaningless generalities. This is a real difficulty, but experience shows that it is not insuperable. It is no uncommon thing to hear teachers maintain that their pupils grow in intellectual stature through the study of general history more than through any other one subject, and this is frequently corroborated by the pupils themselves. Moreover, this objection lies with even greater force against the history of separate nations. No secondary teacher who has ever tried both plans needs to be told that national history offers tenfold greater facilities for the application of the old-time memoriter method, and that the temptation to be content with mechanical memorizing and repetition of facts and dates is therefore proportionately greater than in the topical study of general history. This is so obvious that it may fairly be regarded as self-evident.

A more important reason for the opposition to general history is suggested by the following passage in the report of the Madison Conference: "Fortunately, the subject of history, like that of natural science, is one in which the educational advantages may be obtained without covering the whole field." This

indicates that the discarding of general history is a part and a result of the attempt to transfer attention and emphasis from the informational to the disciplinary side of the subject, the assumption being that the very incompleteness of the knowledge thus attained will tend to concentrate attention on the educational effect of the exercise. But however desirable this object may be, it is, at least, open to question whether the means adopted will not injure rather than promote the cause of historical study.

In the first place, can we afford to have people and pupils feel that the knowledge acquired in the study of history is a matter of no moment? Is not the attitude of the public towards purely formal studies, which are ridiculed as mere "intellectual gymnastics," a sufficient warning of the dangers inherent in this procedure? Moreover, waiving this question of expediency, is it true that the informational value of history can be safely neglected? Are we justified in sending pupils out into life with an imperfect and distorted conception of what has actually happened in the world, and, consequently, of the forces which are operative in the present and destined to control the future?

In order to break the force of this objection, it is suggested that French or German history be "so taught as to elucidate the general movement of mediæval and modern history." If this could really be done, there would be little room for controversy. But is it psychologically possible? Is it not rather in conflict with the precepts of sound pedagogy, no less than the teachings of experience?

Let us consider a moment just what is involved in this proposal.

Less than a generation ago, history was either not taught at all in American colleges, or was taught as a side issue by some overworked professor in another department. The marvelous change which we see today is due, above all, to one cause: the doctrine of the unity of history; that is, of a progressive development pervading the entire course of human events. In the words of Professor Sloane: "The doctrine of the unity of his-

tory has been so emphasized that the consequences are simply revolutionary. . . . To accept the doctrine of unity is to admit that no country is more than one wheel in the series which moves the hands on the dial plate of human progress. . . . We no longer study nations, but epochs. . . . We have found the movement of the race more majestic than that of nations or individuals." And President Adams says: "The history of civilization is one continuous story of development. . . . Before this fact all artificial distinctions between different periods of history and different kinds of history fade away."

Now it is precisely this fundamental doctrine of unity which is ignored in the new programme. One wheel—to retain Professor Sloane's metaphor—is to be substituted for the whole series; the study of separate nations is to displace that of human development; and the artificial distinctions between different kinds of history are to be restored. Could anything be more reactionary? The old text-books in logic used to cite the case of a man who carried about a single brick as a sample of the house which he wished to sell; is not this a fallacy of exactly the same kind? In both cases the logical error consists in the substitution of a part for the whole, forgetful of the fact that the whole contains something different from and superior to any or all of the parts. Outside of mathematics it is seldom true that the sum of the parts is equal to the whole. For this reason a pupil might study in succession each of the great nations, and yet at the end of his course, on account of the artificial separations and groupings thus occasioned, be unable to form any correct conception of the general movement of history. Something very like this actually happened in the case of a boy of unusual ability who had studied both French and English history, but was unable to grasp them in their relations to each other or to the rest of the world until he studied general history; then he declared that it seemed as though the sun broke through the fog, and he saw in their true relations things which before had been confused and distorted.

It would seem, therefore, from this point of view, to be almost a truism that the only way of really "elucidating the general movement of history" is to study the general movement of history, not as a mere appendage to the history of France or Germany, but as being *per se* the chief subject of historical study. Any other treatment must fatally obscure the unity and perspective of history, by giving to one nation the prominence which belongs rightfully only to the common achievements of all nations.

In view of this fact, what is to be said of the claim that equal or greater disciplinary results may be obtained from a limited portion of history?

Before answering this question, a distinction must be made between technical and general discipline: the one being best attained by the intensive study of parts, the other by the extensive study of wholes. If the object of historical study be exclusively the mastery of the processes of historical interpretation and criticism, it is perfectly true that the history of some one nation would be preferable to general history. Not only so, but a single period would be better still, and a single document studied intensively month after month would be best of all. But such intensive study presupposes maturity of mind which cannot be expected in secondary schools, and a wide knowledge of the subject as a whole—the very thing it is now proposed to get along without. Moreover, even were this not the case, such technical skill would be relatively useless for all pupils not destined to become scholars by profession. And the chief function of secondary schools is not the training of scholars, but the education of men and citizens. The discipline demanded of history, as of all other subjects, is, therefore, not technical but general. It is that training of the mind and heart which will be most valuable in the most difficult and most neglected of all fine arts—the conduct of one's own life.

If this is true, it is difficult to escape the conclusion that the cutting up of history into a number of longitudinal strips, of which the pupil could take only a small part, would diminish

both the informational and the educational value of the subject. Can the interest of the pupils be sustained when they see only snatches, here and there, of the great drama, while the rest goes on behind the scenes? Can they follow with equal certainty the relation of cause and effect, when the one or the other usually lies in regions beyond their gaze? Can their judgment receive a training of equal value when the materials for comparison are largely denied them? Can the moral uplifting and purification, which constitute so large a part of the value of history, take place when the unity of action is destroyed, causing the Nemesis of nations to appear as arbitrary will or blind chance? Finally, can the study produce the deepest and most abiding impressions on mind and character when the pupil sees but dimly, at uncertain intervals, the sublime Procession of the Ages—the slow but absolutely sure and irresistible advance of human progress out of the measureless past even to the present?

To all these questions it would appear that but one answer can be made, and that, an answer not favorable to the elimination of general history from the course.

In the arrangement of courses of study local conditions must be taken into consideration. But, in general, some such arrangement as the following would possess distinct advantages:

Ninth grade, Ancient History, three periods per week.

Tenth grade, Mediæval and Modern History, three periods per week.

Eleventh grade, English History, three to five periods per week.

Twelfth grade, American History and Civics, five periods per week.

No doubt the objection will at once be raised that it is impossible to teach this amount of history and at the same time meet collegiate requirements in other branches. At present this is unfortunately true. But the time is surely at hand when the many who never enter college will no longer be sacrificed to the few who do, or rather to the antiquated requirements which the colleges still maintain. If they cannot be brought to modify these, then so much the worse for the colleges. But there are encouraging signs of progress all along the line. Last fall, Dr. Tetlow nearly secured important action in this direction on the

part of the New England Association of Colleges and Preparatory Schools, and we are surely justified in expecting results of the greatest importance from the labors of the National Committee, and the several Advisory Committees, on college entrance requirements. The difficulty is therefore in a fair way to be removed. For the present it may be met in all except the smallest schools by offering college-preparatory pupils the required studies, and at the same time giving to others that training which will best fit them for life. This is not only the chief function of secondary schools but their imperative duty.

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BOOK REVIEWS

SOME NEW BOOKS ON EDUCATION

Horace Mann and the Common School Revival in the United States.
By B. A. HINSDALE. Charles Scribner's Sons.

DR. HINSDALE has not only written a vivid and most readable biography of a very interesting person; he has also presented in the clearest light just what were the services of Horace Mann to the common school cause. The method of treatment is not chronological, but incidental; that is to say, he has not undertaken to show what Mann did month by month, but has selected the significant incidents in his career, and made much of them. It may be, as the author himself admits, that something is thus lost of continuity, but the gain in clearness more than compensates such a possible loss; at any rate, after finishing the book one is not inclined to quarrel with the author's method, but rather to compliment him on the admirable results.

The book opens with an account of the development of the common schools down to the time of Horace Mann, followed by a chapter on the men and movements that immediately prepared the way for his ministry. For Mann's career as an educator was, from beginning to end, a ministry of toil, sacrifice, even of suffering. His was the call to the vocation of the martyr. This fact, and the spirit in which he performed his work, are strongly and appropriately emphasized by Dr. Hinsdale. This is the inspiring feature of the book.

That Horace Mann was great as an agitator and organizer in the educational field, and that his knowledge of the science of education was as limited as his interest in the same was scanty, may be news to many. It is not so long ago—no longer than Horace Mann's time at least—that anyone was esteemed worthy of almost any place in the teaching profession, with no special training at all, not infrequently with very scanty education or "learning." There need be little wonder, therefore, that the teacher or educator is now rather generally regarded as a man—or maid—of all work, little recognition being as yet given to

the fact that education is, perhaps, the broadest of all human interests—preeminently the field for specialization. Horace Mann was a specialist in a field in which the practical teacher has often failed. The nature and character of his service come out strongly in these pages. To make the distinction clearer, Dr. Hinsdale frequently uses the word "pedagogist" as a something Horace Mann was not. Few of us would fail to be duly grateful for not being called such a thing as that. May the word have a short life and a merry one!

How very little there is new under the sun after all! Many of the questions Horace Mann had to meet are burning questions today—especially modern are the matters of women teachers (p. 175), whom Mann favored; the religious controversy (p. 214 *seq.*), which is in its essentials now on again in Indiana; the public supervision of private schools (p. 297); and the real foundation upon which common schools rest (p. 177), a question which Mann seems to have treated for all time.

There is opportunity for some to differ with the author on his use of the word "revival," as applied to the increased interest in common schools. Just what there had ever been to revive is not quite easy to see. Dr. Hinsdale seems to show quite clearly that there were no common schools of any account, generally speaking, up to about the time of Mann's appearance on the stage, with the exception of the early efforts of the Puritans. These Puritan schools were, after all, not exactly prototypes of the schools Mann labored for. There was, in his day, a great awakening to school needs, from which dates the public school system that we know and honor. Perhaps it is legitimate to find the beginnings of this liveliness in Puritan laws; but the beginning was very small and very remote, quite incommensurable with the movement.

On the whole, few books, if any, that have appeared in our country of recent years can be read with more interest and permanent profit than Dr. Hinsdale's judicious yet enthusiastic sketch of the life and achievements of the great American educational statesman of the first half of our century.

English National Education. By H. HOLMAN. London: Blackie & Son.

As a sketch of the rise of public elementary schools in England this work of Professor Holman's is a helpful addition to our knowledge

of educational affairs in England. Nowhere else can so much information on its special subject be found in so small compass and in such an interesting form as in this volume. There has been a prevalent opinion that there was more to wonder at than to admire in public education in England, but a cynical American could hardly equal Professor Holman's summing up of the whole matter in the final paragraph of his book: "We have all the raw material out of which to make a splendid system of schools. There remain but two things to be done to make practically perfect our system of national education, viz., to make it national, and to make it educational."

Thomas and Matthew Arnold and their Influence on English Education. By SIR JOSHUA FITCH. "Great Educators Series." Charles Scribner's Sons.

THE attempt to force Matthew Arnold into the category of "great educators" is hardly justified by the result. Of Thomas Arnold Sir Joshua Fitch writes with enthusiasm, sympathy and affection, but he seemed to find it a difficult and none too welcome task to write the son up to the standard of the father. In fact, after a brave beginning, he fairly gives up the task, making the real center of his sketch of Matthew Arnold, the educator, Matthew Arnold, the man of letters. It may be questioned whether Matthew Arnold himself would have been the more surprised or the less gratified could he have foreseen his posthumous elevation to greatness in a profession to love which he vainly strived all his days. He himself wrote, in 1859: "You know that I have no special interest in the subject of public education" . . . ; and again, in 1862, "I sometimes grow impatient of getting old amidst a press of occupations and labour for which, after all, I was not born. The work I like is not very compatible with any other. But we are not here to have facilities found us for doing the work we like, but to make them." If Matthew Arnold was a great educator, then was Charles Lamb a merchant prince. It is a fine thing, though, to see a man of genius harnessing himself to an uncongenial task, and from a high sense of duty tugging manfully all his days at an ever heavier burden. That is the picture Sir Joshua has really given us of Matthew Arnold—a fine picture—and a pathetic one.

When our author writes of Thomas Arnold he is under happier auspices. Just what Arnold (and in education there is but one) did

for English education we Americans do not readily understand — the fact is, we do not understand English education any too well. No one else, perhaps, has shown so clearly the unmartial, the spiritual nature of Arnold's service as Sir Joshua in these pages. No mere time-serving, place-holding, salary-drawing, so-called teacher need ever trouble to read about Thomas Arnold, as no real teacher is ever likely to read too much about him. He was an informing spirit: "What is imitable in his system—if system it may be called—is not a new educational creed or practice, but the infusion into the system of a new spirit, one of enthusiasm, of clear insight into the inner intellectual and moral needs of scholars, and of careful introspection in reference to those studies which had enriched his own character and intellect most" (Fitch, p. 37). . . . "In teaching, that system which is best administered is best, and Arnold had the power of putting a soul into a method which, in other hands, might prove sterile and mechanical" (p. 43).

O strong soul, by what shore
Tarriest thou now? For that force
Surely has not been left vain.¹

Not vain, indeed, for as the difficulties of our task grow heavier we schoolmasters are looking more and more for guidance and inspiration to the strong and beautiful life of Thomas Arnold, nowhere more finely portrayed than in these vivid pages.

C. H. THURBER

Botany. Plant Life, Considered with Reference to Form and Function. By CHARLES REID BARNES, PH.D., Professor of Plant Physiology in the University of Chicago. 428 pp. Henry Holt & Company.

THIS book represents a striking departure from the ordinary botanical text-book for secondary schools. The conventional types are two in number: the gross structure of flowering plants, accompanied by "analysis;" and purely morphological work, demanding constant use of the compound microscope. Teachers have long been dissatisfied with both types, feeling that the results were far from satisfactory. Professor Barnes has taken an entirely different standpoint, and one that commends itself to every true teacher of nature. Instead of struc-

¹ "Rugby Chapel," by Matthew Arnold.

ture, function is put foremost, and plants are studied as living things at work, a fact aptly suggested by the title. The style is clear and simple, the presentation is very logical, and the whole book is full of the flavor of a thorough, well-posted teacher.

The book is not intended to be recited *seriatim*, but is a book to be read in connection with laboratory work, a book in which the main facts of the science are clearly stated. Teachers apart from the universities are in constant danger of holding to abandoned views, and a book is needed now and then to bring a rapidly developing subject up to date. Professor Barnes has done this service admirably. The four parts of the book present a clear elementary statement of present views of the vegetative body, physiology, reproduction, and ecology. This division enables the author to present these great subjects continuously, without breaking them up into fragments.

While all the parts are fresh, those dealing with physiology and ecology are especially noteworthy. More stale physiology is taught in connection with plants than one would imagine, until he reads the admirably clear and simple outline given in the book before us. Ecology is new in elementary instruction, to which it is especially adapted, and it is to be hoped that this modest beginning is but the promise of its domination in future texts for elementary instruction.

It is safe to say that this is the best elementary book on botany that is now accessible to American secondary schools.

JOHN M. COULTER

NOTES

School Improvement League of Maine.—State Superintendent W. W. Stetson, of Maine, has issued a valuable pamphlet describing the aims, methods, and organization of the School Improvement League of Maine. The objects are: To improve school grounds and buildings; to furnish suitable reading matter for pupils and people; to provide works of art for schoolrooms. The membership consists of all who may be interested in the objects of the league sufficiently to pay very moderate dues. The directions as to the work of the league are so practical that they are here given practically in full.

The funds of the league should be used to purchase one of the lists of the books given in another section of this circular. It will be noticed that each list consists of seventeen titles, and that it includes works in history, biography, science, travels, and fiction. These books should be loaned to the members, read by them, and a certain amount of time should be given to studying the lives of their authors and giving detailed outlines of the books themselves. These outlines should include such items as will give one a clear idea of the facts and thoughts expressed, and should conclude with such an estimate of their value and merits as will assist the children in forming opinions as to the literary quality of the work, and the facts and conclusions stated by the author. At the close of each term arrangements should be made to exchange books with the nearest league in the same town. This system of exchange should be continued until the books of any given league have been in the possession of all the leagues of the town for one term. They should then be returned to the league by which they were purchased, and become its permanent property. By adopting this plan each pupil in town will have the reading of from 100 to 150 standard books. Provision should be made for replacing any books willfully destroyed or injured by the league in which the injury or destruction occurs.

The funds of the league should also be used to purchase, at least, two pictures and one piece of statuary. They should remain for one term in the possession of the league purchasing them. During this time a careful study should be made of the life of the artist, the story of the picture or cast, and such discussions should be conducted as will enable the children to understand clearly and definitely the thoughts and feelings which the artist sought to embody.

At the close of the term they should be exchanged on the plan outlined

for the exchange of books. Thus each pupil in town will have the opportunity, during his school life, to sit in the presence of, listen to talks upon, and carefully study from twenty to thirty-five different works of art. In another section of this circular will be found lists of pictures and casts suitable for common schools.

Try to persuade the town to furnish a school lot at least one acre in area, with a frontage of not less than 180 feet and a depth of about 240 feet, and have the school building so located that it will not be within 100 feet of the road or street. Provide, by the efforts of the members of the league or otherwise, for grading the lot, removing the bushes, grass and weeds, planting trees, shrubs and flowers, and building a suitable fence on the sides and rear of the lot.

When changes are made in school buildings, or new buildings are erected, urge that the windows be placed at the left and rear of the children when seated. Have them massed, with mullions between the sections; have the rear window in the side wall within a foot of the rear wall, and the front window opposite the front row of seats. The windows should extend to within six inches of the ceiling, and the window sills should be, at least, as high as the eyes of the children when seated. If it is necessary to place windows in the rear wall, have them in the center from right to left, with mullions between the sections.

Have the colors of the schoolroom so arranged that the floor will be the darkest part of the room, the wainscoting lighter than the floor, the walls lighter than the wainscoting, and the ceiling the lightest portion of the room. The ceiling should be pure white or light cream. The walls may be light drab, cream, light gray, light bluish gray, or light greenish yellow.

Have the desks so arranged that the edge of the desk next to and in front of the child, in the primary grade, shall be nine inches from the back of the seat in which he is seated. This distance should be ten inches in intermediate grades, eleven inches in grammar grades, and twelve inches in high-school grades.

Have the stove surrounded with a Russia-iron jacket, securely fastened to the floor, and extending about one foot above the top of the stove, and not within six inches of any part of the stove. Have a cold-air shaft running from beneath the stove to the nearest wall, with the opening in the same not less than thirty inches square. If possible, have a ventilating shaft in connection with the chimney of the same size as the cold-air shaft beneath the stove. The doors and windows should be thrown wide open for at least fifteen minutes in the morning, closing them half an hour before the opening of the morning session. They should also be open for five minutes during all recesses, fifteen minutes during the noon intermission, and not less than half an hour after the close of school at night.

The school building should be kept scrupulously clean.

The pamphlet concludes with a list of books, list of publishers, list of casts and pictures, and list of dealers in casts, photographs, etc.

Members and Adherents of eight leading Denominations in sixteen State Universities.—From a pamphlet entitled *The Religious Census of the State Universities and of the Presbyterian Colleges*, edited by Francis W. Kelsey, the following interesting table is copied. (The figures are for the collegiate year 1896-7).

University of	Methodist Episcopal	Presbyterian	Congregational	Episcopal	Baptist	Church of Christ	Roman Catholic	Unitarian
Colorado	44	52	30	44	13	11
Idaho	19	24	2	6	..	4	2	..
Illinois	206	153	80	26	50	38	15	3
Indiana	212	160	7	7	37	88	9	9
Iowa ¹	285	225	147	99	102	54	60	30
Kansas	226	148	157	70	52	51	24	38
Michigan	536	465	402	348	205	78	120	119
Minnesota ²	250	300	400	200	175	50	75	60
Missouri	117	150	7	28	111	145	27	1
Nebraska	146	126	81	45	63	58	10	7
Nevada	30	1	8	19	7	1	26	4
North Carolina ¹	79	73	..	73	66	7	3	..
Ohio ¹	261	126	63	51	24	12	27	10
Washington	21	17	46	27	20	2	6	..
West Virginia	103	64	..	32	38	8	6	..
Wisconsin ¹	124	200	300	140	100	..	118	150
Total	2,659	2,284	1,730	1,215	1,063	607	528	431

¹ The figures given for Iowa, Minnesota, North Carolina, Ohio, and Wisconsin are estimates based upon an incomplete census.

The Summer School in Jena.—The summer courses in Jena for 1898 opened on August 3 and continued three weeks. This flourishing and useful summer school had its origin in the brain of an Englishman, Mr. J. J. Findlay, who was a student in Jena under Professor Rein. His idea was to get about twenty English teachers to go to Jena and join with an equal number of Germans in attending courses in German literature and kindred topics, for the purpose of gaining not alone knowledge of the German language, but also insight into German life and thought. All exercises were to be conducted in German. This plan was made known in England in 1891, and the first session was to be held in 1892, but so hearty was the response of those interested, and so numerous were those who desired to take part, that it was necessary to postpone the first session for a year. Then the plan was somewhat changed, so that at the first session, in 1893, there were 13 foreigners, from three countries, in attendance. This year the attendants numbered 168, 11 of whom had only a slight connection with the regular courses. Of these, 59 were ladies, representing ten countries. The Germans in attendance numbered 65, the Americans 17, English 35. Thirteen countries were represented, several by persons sent directly by the government. Nearly all the attendants were teachers.

The summer courses, or vacation courses, as they are called in the circulars, are not given under the auspices of the University of Jena, although most of the courses are given by professors, and the general management is in the hands of three professors, who constitute a committee for the purpose. A secretary conducts the correspondence and acts as treasurer and general information bureau during the session.

For 1898 there were 19 instructors and 25 courses. The latter are thrown into two great groups: (1) general courses, which embrace general psychology, natural philosophy, geology, physiological psychology, philosophy, history of religion, history of civilization, pedagogy (under which seven different courses are given), and German language (here two courses are given, one for those who know nothing whatever of the language, and one in literature, for those who already understand some German); (2) technical scientific courses, ten in number, with laboratory exercises. Some of these last had been given in Jena for several years before the organization of the present summer school.

The courses consist of 6, 12, or 18 exercises each, and the fee is $7\frac{1}{2}$, 15, or 30 marks for each course, to which must be added the registration fee of 5 marks.

The most largely attended course was that of Professor Rein, in exposition of the principles of the Herbartian school, of which he is the head. There were 71 in attendance. Next came Professor Ziehen's physiological psychology with 48, and then the language courses. The last named were the only courses that extended through three weeks, and cost the maximum fee

of 30 marks. Almost daily excursions were made by the members of these courses, under the leadership of the instructor, to neighboring points of interest, like the battlefield of Jena, ruined castles, the Schiller house, and the Erlkönig. The neighborhood of Jena is very rich in historical and literary associations, situated as it is in the beautiful Thüringian forest, and not far from Weimar and the Wartburg. Three excursions were made by members of all the courses: to Schwartzburg, to Weimar, and to Eisenach and the Wartburg. Four times during the two weeks gatherings were held in the historic "Burgkeller," which were enlivened by music and speeches and pleasant social converse. Perhaps not the least valuable feature of one's experience at such a place is the interchange of experience and the broadening of view which come from meeting those of the same calling from so many lands. Different social customs and opposite ideals, in education as in life, are brought into sharp contrast. An American finds many new reasons for loving America, while he learns many helpful things with regard to method. The work of the class room is clear, concise, and impressive; an excellent example for all who teach. The instructor knows what he is after and goes direct to the goal. He is well prepared and master of the situation. All the work seemed to be of a very high order. Even the most careless student has gained something, and the trained and attentive have carried with them not alone new knowledge of some subject, but also new methods, new ideas of the educated German, and new appreciation of German life.

THIS year, as every year since the founding of the *SCHOOL REVIEW*, the December issue will contain the full proceedings of the New England Association of Colleges and Secondary Schools. The meeting occurred this year at Springfield, Mass., early in October.

FOR the joint meeting of the college and high school sections of the Illinois State Teachers' Association, to be held during the holiday vacation at Springfield, the following topics have been proposed: (1) Relation between School and College Science; (2) School visiting by College Men.

THE fourth annual meeting of the Association of Colleges and Preparatory Schools of the Southern States will be held the first week in November, probably at Atlanta, or Athens, Ga., the executive committee not having as yet decided definitely on the place of meeting. The proceedings of this meeting will be published in the *SCHOOL REVIEW*.

ARRANGEMENTS are now in progress for the opening of a Commercial High School in Chicago, with the expectation that it will open January 1, 1899. The school will be somewhat experimental at first, having at the beginning but a one year's course. On the principle that some of a good thing is better than none of it, this enterprise may be regarded most hopefully.

NEW PUBLICATIONS

EDUCATION, PHILOSOPHY, PSYCHOLOGY

Metaphysics. By Borden P. Bowne, Professor of Philosophy in Boston University. Revised edition from new plates. Size $5\frac{3}{4} \times 8\frac{3}{4}$ in.; pp. 429. Harper & Brothers.

An Introductory Logic. By James Edwin Creighton, Sage Professor of Logic and Metaphysics in Cornell University. Size $5\frac{3}{4} \times 7\frac{3}{4}$ in.; pp. vii + 387. Price \$1.10. The Macmillan Company.

Essentials of Psychology. By Colin S. Buell, M.A., Principal of the Williams Memorial Institute, New London, Conn. Size $5\frac{3}{4} \times 7\frac{3}{4}$ in.; pp. 5 + 238. Price \$1.10. Ginn & Co., Boston.

Introduction to the Herbartian Principles of Teaching. By Catherine I. Dodd, Day Training Department. The Owens College, Manchester. Size $5 \times 7\frac{3}{4}$ in.; pp. vi + 198. The Macmillan Company.

Theories of the Will in the History of Philosophy. By Archibald Alexander. Size $5 \times 7\frac{1}{2}$ in.; pp. 353. Price \$1.50. Charles Scribner's Sons.

ENGLISH LANGUAGE AND LITERATURE

Poems of American Patriotism. Chosen by Brander Matthews. Size $5 \times 7\frac{1}{2}$ in.; pp. xiii + 279. Price 60 cents. Charles Scribner's Sons.

Stories of Ohio. By William Dean Howells. Size $5 \times 7\frac{1}{2}$ in.; pp. 287. American Book Co.

Stories of Indiana. By Maurice Thompson. Size $5\frac{3}{4} \times 7\frac{1}{2}$ in.; pp. 296. American Book Co.

How to Study Shakespeare. By Wm. H. Fleming, with an introduction by W. J. Rolfe, Litt. D. Size $4 \times 5\frac{3}{4}$ in.; pp. xv + 429. Price \$1. Doubleday & McClure Co., New York.

A History of English Critical Terms. By J. W. Bray, A. M., Professor of English in John B. Stetson University. Size $5 \times 7\frac{1}{2}$ in.; pp. vii + 345. Price \$1. D. C. Heath & Co.

Four-footed Americans and Their Kin. By Mabel Osgood Wright. Edited by Frank M. Chapman. Illustrated by Ernest Seton Thompson. Size $5 \times 7\frac{3}{4}$ in.; pp. xv + 432. Price \$1.50. The Macmillan Company.

Twelve Naval Captains. A record of certain Americans who made themselves immortal. By Molly Elliot Seawell, with portraits. Size $5 \times 7\frac{1}{2}$ in.; pp. 233. Price 60 cents. Charles Scribner's Sons.

Chaucer to Arnold. Types of Literary Art in Prose and Verse. An introduction to English Literature, with Preface and Notes. By Andrew J. George, A.M., Department of English, High School, Newton, Mass. Size $5 \times 7\frac{3}{4}$ in.; pp. 676. Price \$1. The Macmillan Company.

Heath's English Classics.—Goldsmith's Vicar of Wakefield, with Notes and Introduction. By William Henry Hudson, Professor of Literature in Leland Stanford University. Size $5\frac{1}{2} \times 6\frac{1}{2}$ in.; pp. xxiii + 264. Price 50 cents. D. C. Heath & Co.

The New England Poets. A Study of Emerson, Hawthorne, Longfellow, Whittier, Lowell, Holmes. By Wm. Cranston Lawton, author of "Art and Humanity in Homer," "Successors of Homer," etc. Size $4\frac{3}{4} \times 7$ in.; pp. viii + 263. Price 75 cents. The Macmillan Company.

A Study of English Prose Writers. A Laboratory Method. By J. Scott Clark, Professor of the English Language at Northwestern University. Size $5\frac{1}{2} \times 8$ in.; pp. xv + 879. Price \$2. Charles Scribner's Sons.

Student's Readings and Questions in English Literature. By Harriet L. Mason, Drexel Institute. Size 5×7 in.; pp. 85. Price 40 cents. The Macmillan Company.

The Athenaeum Press Series. Selections from the Poetical Works of William Cowper. With an Introduction and Notes by James O. Murray D.D., LL.D., Professor of English Literature in Princeton University. Pp. vii + 243. Price \$1.10. Ginn & Co.

The Athenaeum Press Series. Selections from Shelley. Edited, with Introduction and Notes, by W. J. Alexander, Professor of English in University College, Toronto. Price \$1.25. Ginn & Co., Boston.

Modern American Oratory, Seven Representative Orations. Edited with notes and an essay on the Theory of Oratory. By Ralph Curtis Ringwalt. Size $5 \times 7\frac{3}{4}$ in., pp. vi + 334. Price \$1.00. Henry Holt & Co., New York.

The Clarendon Dictionary. A concise handbook of the English language, in orthography, pronunciation, and definitions. For school, home, and business use. By William Hand Browne, Professor of English Literature in Johns Hopkins University. The Pronunciation by S. S. Haldeman, LL.D., late Professor of Comparative Philology in the University of Pennsylvania. Size $5 \times 6\frac{1}{2}$ in.; pp. iv + 365. University Publishing Co., New York, Boston, New Orleans.

A Short History of English Literature. By George Saintsbury, Professor of Rhetoric and English Literature in the University of Edinburgh. Size $5\frac{1}{4} \times 7\frac{3}{4}$ in.; pp. 20 + 819. Price \$1.50. The Macmillan Company.

Hugh Thomson's Illustrated Fairy Books. Jack the Giant Killer. Price 50 cents. The Macmillan Company.

Buccaneers and Pirates of our Coasts. By Frank R. Stockton, with illustrations by George Varian and B. West Clineinst. Size $5\frac{1}{2} \times 7\frac{3}{4}$ in.; pp. vi + 325. Price \$1.50. The Macmillan Company.⁴

The Boys of Fairport. By Noah Brooks, author of "The Boy Emigrant," "The Boy Settlers," etc. Size $5 \times 7\frac{1}{2}$ in.; pp. 266. Price \$1.25. Charles Scribner's Sons.

Stories from Lowly Life. By C. M. Dupper. With illustrations by Louis Wain. Size $6\frac{1}{4} \times 8\frac{1}{2}$ in.; pp. 95. Price \$1.50. The Macmillan Company.

GREEK AND LATIN LANGUAGES AND LITERATURES

Gildersleeve's Latin Grammar. School edition. By Basil L. Gildersleeve, Professor of Greek in the Johns Hopkins University, and Gonzalez Lodge, Professor of Latin in Bryn Mawr College. Size $5 \times 7\frac{1}{2}$ in.; pp. viii + 328. University Publishing Company, New York, Boston, and New Orleans.

The Students' Series of Latin Classics. Horace, Odes and Epodes. Edited, with Introduction and Notes, by Paul Shorey, Ph.D., Professor in the University of Chicago. Size 5×7 in.; pp. xxxvii + 487. Benj. H. Sanborn & Co., Boston.⁵

The Alcestis of Euripides. Edited, with an Introduction and Critical Exegetical Notes, by Herman Wadsworth Hayley, Ph.D., Instructor in Greek at Wesleyan University. Size 6×8 in.; pp. lxxxvi + 178. Price \$1.60. Ginn & Co.

A Concise Dictionary of Greek and Roman Antiquities. Based on Sir William Smith's larger dictionary, and incorporating the results of modern research. Edited by F. Ware Cornish, M.A., Vice-Provost of Eton College. With over 1100 illustrations, taken from the best examples of ancient art. Size $5\frac{3}{4} \times 9\frac{3}{4}$ in.; pp. 829. Price \$4.00. Henry Holt & Co., New York.

Latin Literature of the Empire. Selected and edited, with revised texts and with brief introduction, by Alfred Gudeman, University of Pennsylvania. In two volumes. Vol. I, Prose: Velleius - Boethius. Size $5 \times 7\frac{1}{2}$ in.; pp. xi + 578. Harper & Brothers.

